

1 CLAIMS:-

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3 1. Apparatus for controlling underwater equipment
4 comprising:

5 attachment means for attaching underwater
6 equipment to the apparatus; and
7 at least one member for generating positive or
8 negative lift.

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10 2. Apparatus according to claim 1, wherein the at
11 least one member is adapted to create a negative
12 lift due to fluid flow in a first direction and is
13 adapted to create a negative lift due to fluid flow
14 in a second, different, direction.

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16 3. Apparatus as claimed in claim 2, wherein the
17 first and second directions are generally opposite
18 to each other.

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20 4. Apparatus as claimed in any preceding claim,
21 which, in use, is adapted to anchor the underwater
22 equipment to a sea- or river-bed.

23

24 5. Apparatus according to any preceding claim,
25 wherein the attachment means is adapted to attach
26 the underwater equipment in close proximity to the
27 centre of gravity of the apparatus.

28

29 6. Apparatus according to any preceding claim,
30 wherein the apparatus is mounted on a number of feet
31 equipped with slippage prevention means, to resist
32 slipping by shear force such that, in use, the

1 negative lift will preferably tend to force said
2 slippage prevention means into a sea- or river-bed
3 thus resisting the drag forces acting on the
4 apparatus tangentially to the seabed.

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6 7. Apparatus as claimed in any preceding claim,
7 wherein the at least one member comprises at least
8 one hydrofoil.

9

10 8. Apparatus according to any preceding claim,
11 wherein differences in pressure acting on opposing
12 surfaces of the at least one member due to a
13 predetermined angle of attack causes said at least
14 one member to generate negative or positive lift.

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16 9. Apparatus as claimed in any preceding claim,
17 which is adapted to control the launch and/or
18 recovery of the underwater equipment.

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20 10. Apparatus according to any preceding claim,
21 wherein the at least one member is free to rotate
22 through a pre-determined angle.

23

24 11. Apparatus according to any preceding claim,
25 wherein the at least one member comprises at least
26 one hydrofoil capable of passive rotation about an
27 axis such that each hydrofoil maintains alignment
28 with a periodically reciprocating rectilinear flow.

29

30 12. Apparatus as claimed in any preceding claim,
31 wherein said at least one member is moveable between
32 a first configuration in which it is capable of

1 generating positive lift and a second configuration
2 in which it is capable of generating negative lift.

3

4 13. Apparatus according to claim 12, wherein the at
5 least one member has a variable actuating means to
6 vary the positive or negative lift generated by the
7 member.

8

9 14. Apparatus according to claim 12 or 13, wherein
10 the at least one member is rotatable between said
11 first and second configurations about a longitudinal
12 axis thereof.

13

14 15. Apparatus according to any one of claims 12-14,
15 wherein a shaft member is adapted to actuate the at
16 least one member to change it between the first and
17 second configurations.

18

19 16. Apparatus according to any one of claims 10-15
20 further comprising a support framework, where a
21 plurality of shaft members are connected to the
22 framework and on which said at least one member is
23 rotatably coupled.

24

25 17. Apparatus according to claim 16, wherein the at
26 least one member comprises a bearing member by means
27 of which it is coupled to a shaft member connected
28 to the support framework.

29

30 18. Apparatus according to claim 17, wherein the
31 bearing member and shaft member combine to provide a

1 rotation enabling portion and a rotation prevention
2 portion.

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4 19. Apparatus according to claim 18, wherein the
5 rotation prevention portion comprises one or more
6 stop members which are adapted to engage with one or
7 more respective stop members mounted on the
8 respective bearing member.

9

10 20. Apparatus according to claim 19, wherein the
11 bearing member is substantially cylindrical and
12 comprises a pair of stop members which are spaced
13 apart around its inner circumference.

14

15 21. Apparatus according to claim 19 or 20, wherein
16 the shaft member comprises a pair of stop members
17 which are spaced apart around its outer
18 circumference.

19

20 22. Apparatus according to claim 21, wherein one of
21 the bearing stop members is engageable with a
22 respective shaft stop member to define a first
23 negative configuration and the other of the bearing
24 stop members is engageable with the other of the
25 shaft stop members to define a second negative
26 configuration.

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28 23. Apparatus as claimed in any one of claims 1-8,
29 wherein the at least one member is rigidly connected
30 to a support framework.

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1 24. Apparatus as claimed in claim 23, wherein the
2 at least one member comprises a disc shaped member
3 which, in use, is adapted to produce positive or
4 negative lift regardless of the direction of flow of
5 fluid thereby.

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7 25. Energy extracting apparatus for extracting
8 energy from fluid flow, said energy extracting
9 apparatus comprising:

10 a turbine;

11 at least one member, which in use, generates
12 positive or negative lift.

13

14 26. A method of controlling underwater equipment;
15 the method comprising:

16 providing an apparatus having at least one
17 member for generating positive or negative lift;

18 attaching the apparatus to underwater
19 equipment;

20 releasing the apparatus into a fluid;

21 allowing fluid to flow past the at least one
22 member to generate positive or negative lift.

23

24 27. A method as claimed in claim 26, wherein the
25 apparatus is placed in a flow of water.

26

27 28. A method as claimed in claim 26, wherein the
28 underwater equipment is a turbine.